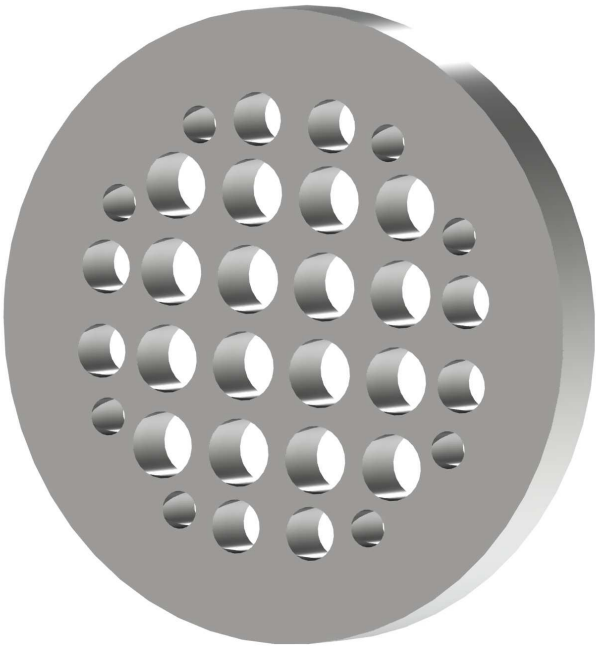
EMIS-VEKTA
1200.UM.PS
27.11.2012
v1.0.5

FLOW CONDITIONER «EMIS-VEKTA 1200»

User manual
Passport



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«EMIS», CJSC
Russia, Chelyabinsk

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CAUTION!

Before you start operating the flow conditioner, you should carefully read this manual. Before starting the installation, use or maintenance of the flow conditioner, make sure that you fully read and understood the contents of the manual. This condition is necessary to ensure safe operation and proper functioning of the product.

For advice, contact your local dealer of "EMIS", CJSC or the support service:

Tel./ Fax: +7 (351) 729-99-12
e-mail: support@emis-kip.ru

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1 Product description

1.1 Applications

Flow conditioner "EMIS-VEKTA 1200" designed to align the flow profile of gaseous and liquid media before flowmeters of various types. Flow conditioner eliminates or significantly reduces the vortices in the flow, and also reduces the deformation of flow profile. Due to installation of the flow conditioner it is possible to use shorter straight pipe before the flowmeter.

Flow conditioner is used mostly in conjunction with the following types of flowmeters:

- vortex flowmeters;
- ultrasonic flowmeters;
- flowmeters based on pressure differential devices.

Flow conditioner "EMIS-VEKTA 1200" corresponds to disk conditioning plate of «Zanker» type according to GOST R 8.586.1.

Structurally, flow conditioner is a disc with 32 holes arranged in a symmetrical circular pattern (Figure 1.1). The thickness of the disk, diameters and coordinates of the holes correspond to the requirements of GOST R 8.586.1.

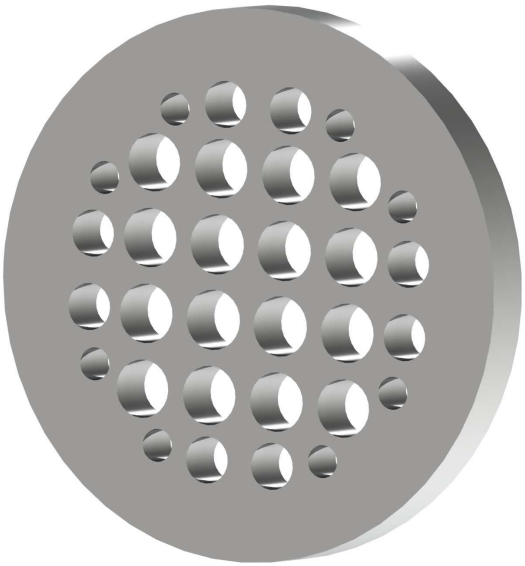


Figure 1.1 – Flow conditioner «EMIS-VEKTA 1200»

1.2 Technical data

Table 1 – Technical data

Parameter	Value
Medium	Liquid, gas, steam
Nominal diameter	15 … 1200 mm
Maximum pressure	According to the pressure of connection kit flanges
Outline dimensions and weight *	See Appendix A
Material *	Cast steel, Stainless steel, Steel AISI A516-60

* At customer's request other materials and dimensions can be used.

1.3 Pressure drop

Pressure drop ΔP for flow conditioner "EMIS-VEKTA 1200" can be calculated in accordance with GOST R 8.586.1 by the formula

$$\Delta P = \xi \cdot 0{,}5 \cdot \rho \cdot w^2, \text{ Pa},$$

where ξ – coefficient of hydraulic resistance. For flow conditioner of «Zanker» type ξ=3;
ρ – density of the medium in working conditions, kg/m^3;
w – average velocity of flow, m/s.

Average velocity of flow calculated as

$$w = 4 \cdot Q \cdot 1000 / (3{,}14 \cdot D^2 \cdot 3{,}6), \text{ m/s},$$

where Q – instant flow rate, m^3/h;
D – inner diameter of the pipeline, mm.

1.4 Delivery set

Delivery set includes:

1. Flow conditioner "EMIS-VEKTA 1200".
2. User manual and passport.
3. Connection kit (by request).

1.5 Model codes

Flow conditioner's modifications are presented in Table 2.

The example of the flow conditioner's modification for the order is showed below.

1	2
050	S
Modification for the order: EMIS-VEKTA 1200 050-S	

Table 2 – Model codes for flow conditioner

1	Nominal diameter of the pipeline
015	DN = 15 mm
025	DN = 25 mm
032	DN = 32 mm
040	DN = 40 mm
050	DN = 50 mm
065	DN = 65 mm
080	DN = 080 mm
100	DN = 100 mm
125	DN = 125 mm
150	DN = 150 mm
200	DN = 200 mm
250	DN = 250 mm
300	DN = 300 mm
350	DN = 350 mm
400	DN = 400 mm
500	DN = 500 mm
600	DN = 600 mm
700	DN = 700 mm
800	DN = 800 mm
900	DN = 900 mm
1000	DN = 1000 mm
1200	DN = 1200 mm
XXX	For modifications in strict accordance with GOST R 8.586.1 the actual inner diameter of the pipeline XXX in the units of mm (instead of the nominal diameter) should be specified.
2	**Material of the flow conditioner**
C	Cast steel
S	Stainless steel
A516	Steel AISI A516-60
X	Special order

By customer's request flow conditioner can be supplied with the connection kit, which includes flanges, gaskets and fasteners. Modifications of the connection kit are presented in Table 3. The example of the connection kit modification for the order is showed below.

1		2		3
050	–	C	–	1.6
Modification for the order: EMIS-VEKTA 1200.CK-050-C-1.6				

Table 3 – Model codes for connection kit

1	Nominal diameter of the pipeline		
015	DN = 15 mm	250	DN = 250 mm
025	DN = 25 mm	300	DN = 300 mm
032	DN = 32 mm	350	DN = 350 mm
040	DN = 40 mm	400	DN = 400 mm
050	DN = 50 mm	500	DN = 500 mm
065	DN = 65 mm	600	DN = 600 mm
080	DN = 080 mm	700	DN = 700 mm
100	DN = 100 mm	800	DN = 800 mm
125	DN = 125 mm	900	DN = 900 mm
150	DN = 150 mm	1000	DN = 1000 mm
200	DN = 200 mm	1200	DN = 1200 mm

2	Material of connection kit flanges
C	Cast steel
S	Stainless steel
A516	Steel AISI A516-60
X	Special order

3	Maximum pressure in the pipeline
1.6	1.6 MPa
2.5	2.5 MPa
4.0	4.0 MPa
6.3	6.3 MPa
10	10 MPa
16	16 MPa
20	20 MPa
X	Special order

Note – For maximum pressure of 2.5 MPa and less the connection kit flanges are of flat type according to GOST 12820-80, for maximum pressure above 2.5 MPa – welding neck flanges according to GOST 12821-80.

2 Operation

2.1 Safety precautions

Installation, operation, maintenance of flow conditioners should be performed by persons studied this manual and safety instructions for working on the object of installation.

Installation of flow conditioners in the pipeline and its dismantling should be performed without pressure in the pipeline.

During installation the hazardous factors are:

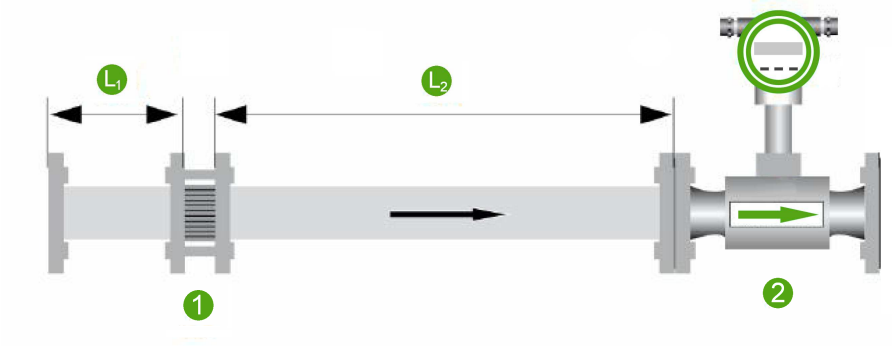
- excess pressure in the pipeline;
- high temperature of the medium.

Installation of flow conditioner with flanges which are not complied with the maximum pressure in the pipeline is prohibited.

2.2 Preparation for installation

Before installation the flow conditioner, it is necessary to find the proper place of installation considering the requirements for the minimum length of straight sections of the pipeline.

Requirements for the length of straight pipe sections before the flow conditioner (L_1 in Figure 2.1), and between the flow conditioner and the flowmeter (L_2 in Figure 2.1) are specified in the documentation for the corresponding flowmeter.



1 – flow conditioner
2 – flowmeter

Figure *2.1 – Requirements for the length of straight sections of the pipeline*

2.3 Installation on pipeline

Installation sequence

Prior to installation, it is necessary to check the completeness of the flanges, gaskets and fasteners of the connection kit and conformity of all mounting parts to the modification of the flow conditioner.

To install the flow conditioner using flat type flanges according to GOST 12820 do the following steps:

- cut the pipeline section of length Linst:

$$Linst = S + 2*Lg + 2*Lf,$$

where S – thickness of the flow conditioner (see Appendix A);

Lg – gasket thickness (see Appendix B);

Lf – flange thickness minus depth of landing on the pipeline (see Figure 2.2);

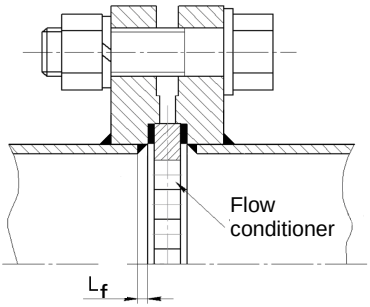


Figure 2.2 – Installation of the flow conditioner

- put the connection kit flanges on both sides of the pipeline;
- fix the flow conditioner along with the gaskets between the flanges using fasteners from the connection kit;
- center the flanges along the pipeline and slightly weld them to the pipeline at a few spots;
- disassemble and remove flow conditioner and gaskets;
- finally weld the flanges to the pipeline, it may take dismantling of the section L2 (see Figure 2.1) of the pipeline between the flow conditioner and the flowmeter;
- install the flow conditioner between the flanges and gaskets;
- fix the flow conditioner with bolts (stud bolts), washers and nuts. Nuts should not be finally tightened yet;
- tighten the nuts in the sequence shown in Figure 2.3.

To install the flow conditioner using welding neck flanges according to GOST 12821 do the following steps:

- cut the pipeline section of length Linst:

$$Linst = S + 2*Lg + 2*Lf,$$

where S – thickness of the flow conditioner (see Appendix A);
Lg – gasket thickness (see Appendix B);
Lf – flange length minus depth of landing on the pipeline;

- fix the flow conditioner along with the gaskets between the flanges using fasteners from the connection kit;
- put the assembled unit into the cut section of the pipeline, center the flanges along the pipeline and slightly weld them to the pipeline at a few spots;
- disassemble the unit and remove flow conditioner and gaskets;
- finally weld the flanges to the pipeline;
- install the flow conditioner between the flanges and gaskets;
- fix the flow conditioner with bolts (stud bolts), washers and nuts. Nuts should not be finally tightened yet;
- tighten the nuts in the sequence shown in Figure 2.3.

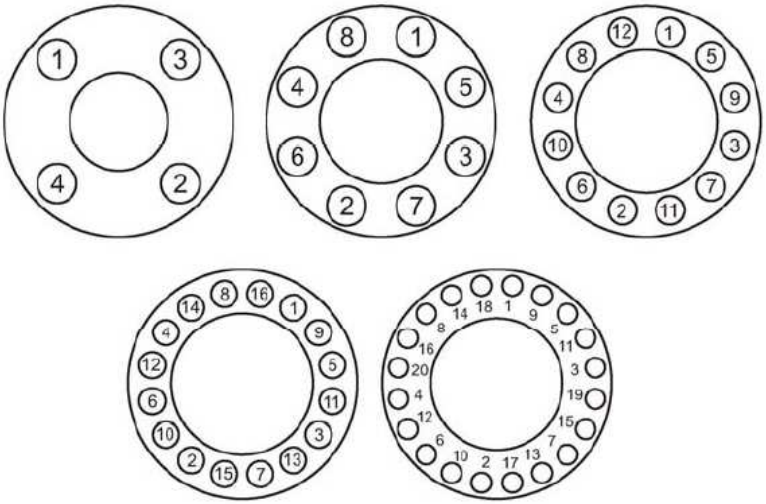


Figure 2.3 – The sequence of tightening the flange bolts (stud bolts)

3 Maintenance

3.1 General recommendations

It is recommended to perform periodic inspection and routine maintenance of the flow conditioner. Period of these operations is set by the operating organization.

3.2 Periodical inspections

On periodic inspection the flow conditioner and its installation place must be inspected without dismantle. One should pay attention to:

- appearance – there should not be dents, cracks and other damage to the outer surfaces of the product and its fixing flanges;
- presence of fasteners - all stud bolts must be in place and tightened;
- absence of traces of corrosion.

3.3 Periodical maintenance

On periodic maintenance the flow conditioner should be dismantled and the following operations should be performed:

- clean the surface of the product from dirt and corrosion;
- replace gaskets (their dimensions are given in Appendix B);
- replace worn fasteners.

4 Storage

4.1 General recommendations

Flow conditioners can be stored in heated and non-heated rooms, providing the air doesn't contain substances, which are corrosive for the product. If necessary, the surface of the product may be covered with corrosion oils.

5 Transportation

5.1 General recommendations

Flow conditioners can be transported by all kinds of transport without restrictions.

6 Example of reclamation act

Customer of the product (organization name)		«Organization», CJSC
Contact person		John Smith
Phone		(495)12293333
Modification of the flowmeter		EMIS-VEKTA 1200 050-S
Serial number		123
Date of manufacturing		14th March, 2012
Date of commissioning		25th May, 2012
Date of fault detection		18th July, 2012
Customer's description of the fault		
Possible reasons of the fault		
Parameters of the measured medium	***Measured medium***	water
	Temperature, °C	+92
	Pressure, bar	2.3
	Estimated flow rate, kg/h	6.5
Conclusion of the customer		

Customer representative: _____ _____ _____
date name signature

Representative or organization performed installation and commissioning: _____ _____ _____
date name signature

Appendix A

Outline dimensions

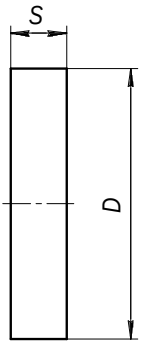


Figure A.1 – Outline dimensions of the flow conditioner

Table A.1 – Outline diimensions

Nominal diameter DN, mm *	Outline dimensions, mm		Weight, kg
	S	*D*	
15	2.3	39	0.03
25	3.8	57	0.05
32	4.8	65	0.09
40	5	75	0.15
50	7	87	0.28
65	8	109	0.4
80	10	120	0.7
100	13	149	1.4
125	16	175	2.2
150	20	203	3.8
200	26	259	7.8
250	33	312	14
300	39	363	22
350	46	421	34
400	52	473	48
500	65	575	87
600	78	677	141
700	91	777	213
800	104	877	306
900	117	980	426
1000	130	1080	568
1200	156	1280	943

1. ** Dimensions for other DN must be specified when ordering.*
2. *Dimensions of flow conditioner plates produced by special order may vary from the ones given in the table above and must be specified when ordering.*

Appendix B

Gasket dimensions

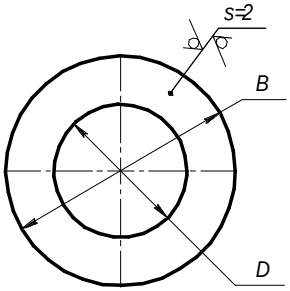


Figure B.1 – Gasket drawing

Material of gaskets is Paronite PON 2 GOST 481-80.
Dimensions are presented in Table B.1.

Table B.1 – Gasket dimensions

DN, mm	*D, mm*	*B,mm*
15	19	39
25	33	57
32	39	65
40	46	75
50	59	87
65	78	109
80	91	120
100	110	149
125	135	175
150	161	203
200	222	259
250	273	312
300	325	363
350	377	421
400	426	473
500	530	575
600	630	677
700	720	777
800	820	877
900	920	980
1000	1020	1080
1200	1220	1280

Note: For special orders with agreement with the customer the gasket can be of different type or absent.

Passport

Basic information

Flow conditioner «EMIS-VEKTA 1200»

Manufactured by «EMIS», CJSC, Russian Federation, 454007, Chelyabinsk, Lenin St. 3, http://www.emis-kip.ru

Serial number _____

Date of manufacturing _____

Delivery set

Delivery set	
☐ EMIS-VEKTA 1200	Flow conditioner «EMIS-VEKTA 1200»
☐ EMIS-VEKTA 1200.UM.PS	User manual, Passport
☐ EMIS-VEKTA 1200. CK	Connection kit

Acceptance

Flow conditioner "EMIS-VEKTA 1200" meets the requirements of design documentation and found qualified for operation.

Responsible for acceptance _____

Packaging

Flow conditioner "EMIS-VEKTA 1200" is packed in accordance with the requirements of design documentation.

Date of packaging _____

Responsible for packaging _____

Warranty

Warranty period is 36 months from the date of commissioning, but not more than 42 months from the date of delivery of the product.

Commissioning

Commissioning date _____

Position, name and signature of the person responsible for commissioning

_____

www.emis-kip.ru

«EMIS», CJSC

«Electronic and Mechanical Measurement Systems»

Russian Federation
454007, Chelyabinsk
Lenin St.,3

Sales department

Phone (351) 729-99-12,
Ext. 111,121,131
Fax (351) 729-99-13

sales@emis-kip.ru

Customer support and service department

8-912-303-00-41
support@emis-kip.ru

Marketing department
Phone (351) 729-99-12
Ext. 331, 332
Fax (351) 729-99-13
marketing@emis-kip.ru